Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	PR Docket No. 93-61
Amendment of Part 90 of the Commission's Rules to Adopt Regulations for Automatic Vehicle Monitoring Systems	)	RM-8013

ADDITIONAL COMMENTS OF MFS NETWORK TECHNOLOGIES, INC. AND TEXAS INSTRUMENTS INCORPORATED ON PACTEL TELETRAC EX PARTE FILING

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OFFICE OF THE SECRETARY

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Pursuant to the Commission's request for additional comments,[1/] MFS Network Technologies, Inc. and Texas Instruments Incorporated ("MFS/TI"), by their undersigned counsel, hereby jointly submit these comments in the above-captioned proceeding. As a preliminary matter, MFS/TI reiterate their unequivocal support for the adoption of permanent automatic vehicle monitoring ("AVM") rules that will foster continued technological innovation and competition among AVM system operators.[2/] In that vein, MFS/TI welcome PacTel Teletrac's ("PacTel") efforts to move this proceeding forward. Nevertheless, MFS/TI do not believe that the spectrum sharing proposal detailed in PacTel's January 26, 1994, *ex parte* filing is in the public interest.[3/] Accordingly, MFS/TI urge the Commission to reject PacTel's wide-area spectrum sharing plan unless it is modified to eliminate spectrum waste.

1/ *See* Public Notice, DA 94-129 (released February 9, 1994); 59 Fed. Reg. 7239 (February 15, 1994); Order, PR Docket 93-61 (released February 25, 1994).

2/ For purposes of these comments, MFS/TI use the term "AVM" to refer to all AVM, automatic vehicle identification ("AVI"), location and monitoring services ("LMS"), electronic toll traffic management ("ETTM") and other Intelligent Vehicle Highway Systems ("IVHS").

3/ *See* PacTel Teletrac *Ex Parte* letter to Ralph Haller, Chief, Private Radio Bureau (dated January 26, 1994).

MFS/TI applaud PacTel's recognition that the public interest in ensuring the fair and equitable use of our scarce spectrum resources requires that multiple wide-area multilateration AVM system operators share the spectrum designated for use by wide-area, pulse ranging AVM systems. In particular, MFS/TI applaud PacTel's effort to develop technical rules that will not only facilitate sharing of the spectrum allocated for wideband multilateration AVM systems, but that will reduce the amount of exclusive spectrum in the 902 - 928 MHz band required to operate wide-area multilateration AVM systems. In this regard, PacTel's wide-area AVM spectrum proposal is consistent with MFS/TI's view that wide-area AVM systems can share spectrum and operate on less than 16 MHz of spectrum.

The wide-area spectrum sharing proposal outlined in PacTel's *ex parte* filing is a significant improvement over PacTel's original proposal for 16 MHz of exclusive spectrum to the extent that it will permit nonwide-area AVM systems to share 12.89 MHz of contiguous spectrum. However, even this new spectrum proposal fails to provide sufficient contiguous spectrum for nonwide-area AVM systems to use on a shared basis. In particular, PacTel's spectrum sharing plan will unnecessarily waste nearly 3 MHz of spectrum (925.39 - 928 MHz) by placing 500 KHz of the 10 MHz to be reserved for exclusive use by wide-area systems (to be used as narrowband forward links for wide-area AVM systems) at 924.89 - 925.39 MHz band. MFS/TI submit that the alternative spectrum allocation proposal first detailed in their comments[4/] and further clarified in their *ex parte* comments[5/] in this proceeding best serves the public interest. That proposal -- which would establish a single 8 MHz band for wide-area

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4/ *See* Joint Comments on Notice of Proposed Rulemaking; Texas Instruments Incorporated, MFS Network Technologies, Inc., RM-8013, PR Docket No. 93-61 (filed June 29, 1993).

5/ *See Ex Parte* Comments of MFS Network Technologies, Inc. and Texas Instruments Incorporated, RM-8013, PR Docket No. 93-61 (filed December 2, 1993).

systems and leave the remaining 18 MHz of contiguous spectrum for all other AVM technologies to share -- appropriately balances the interests of competing AVM system operators and technologies without wasting spectrum or foreclosing the possibility of competition in the future. Accordingly, MFS/TI urge the Commission to adopt their alternative compromise spectrum allocation proposal.

I. PACTEL PROPOSES A WIDE-AREA AVM SPECTRUM SHARING PLAN THAT FACILITATES SPECTRUM SHARING BETWEEN WIDE-AREA AVM SYSTEMS, BUT UNNECESSARILY WASTES SPECTRUM

In its most recent *ex parte* filing, PacTel proposes technical rules that will enable two wide-area multilateration AVM systems to share spectrum within a service area.[6/] Specifically, PacTel's amended spectrum plan proposes that the Commission allocate the:

- 902.5 - 912 MHz band for the exclusive use of wide-area multilateration AVM systems,
- 912 - 924 MHz and the 925.39 - 928 MHz band for nonwide-area AVM systems,
- 902 - 902.5 as narrowband forward links for the 912 - 924 MHz and the 925.39 - 928 MHz band, and
- the 924.89 - 925.14/925.14 - 925.39 as narrowband forward links for the wide-area AVM systems operating in the 902.5 - 912 MHz band.

PacTel argues that these forward links must be placed outside of the wide-area band to ensure reliable contact with vehicles, minimize system degradation, and to provide for future services.

[6/] PacTel states that its wide-area spectrum sharing proposal does not provide for more than two wide-area AVM systems to operate within a service area because of technical constraints. PacTel submits that the operation of three or more systems in a service area would cause substantial degradation in service. *See* PacTel's *Ex Parte*, *supra* at 2.

This spectrum plan is summarized in the chart below:

FREQ.	902.0-902.5	902.5-904	904-910.5	910.5-912	924.89-925.14	925.14-925.39
USE	NBFL Upper Segment	WBFL2	LOCATION	WBFL1	NBFL1	NBFL2
B/W	500 KHz	1.5 MHz	6.5 MHz	1.5 MHz	250 KHz	250 KHz

NOTE: If either system does not use a wideband forward link, it has the option of using 8 MHz of contiguous spectrum (LOCATION sub-segment PLUS their appropriate WBFL sub-segment).

Explanation: NBFL1 is a Narrowband Forward Link for system 1.
WBFL1 is a Wideband Forward Link for system 1.
NBFL2 is a Narrowband Forward Link for system 2.
WBFL2 is a Wideband Forward Link for system 2.

PacTel *Ex Parte*, *supra*, Proposed Technical Rules.

As evidenced by the chart, placement of the narrowband forward links in the upper segment of the 902 - 928 MHz band isolates nearly 3 MHz (925.39 - 928 MHz) at the end of the AVM band.

II. THE PUBLIC INTEREST MANDATES THAT THE COMMISSION ADOPT PERMANENT AVM RULES THAT WILL ACCOMMODATE ALL EXISTING AVM TECHNOLOGIES AND PROMOTE TECHNOLOGICAL INNOVATION AND COMPETITION IN THE AVM INDUSTRY

PacTel's spectrum sharing proposal represents a significant improvement over the spectrum allocation proposal outlined in its May 1992 Petition for Rulemaking[7/] and largely adopted in the Commission's notice of proposed rulemaking for permanent AVM rules. Under the proposal detailed in the Commission's Notice, wide-area pulse ranging AVM systems would receive an exclusive allocation of two (2) non-contiguous 8 MHz spectrum blocks, leaving a

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7/ *See* Petition for Rulemaking of North American Teletrac and Location Technologies (filed May 28, 1992).

limited 6 MHz block of spectrum between the two 8 MHz blocks and two scant 2 MHz spectrum blocks on either side of the 8 MHz blocks for shared use by all nonwide-area AVM systems. MFS/TI, together with numerous other parties vehemently opposed this spectrum plan as contrary to the Commission's public interest goal of encouraging competition among AVM system operators and the development of a broad range of AVM technologies.[8/] Specifically, MFS/TI argued that adoption of the 2-8-6-8-2 segmentation proposal would not only favor one technology and one company, it would foreclose the AVM industry to new wide-area AVM system vendors, waste spectrum, and artificially limit the bounds of technological innovation by pre-ordaining specific blocks of spectrum for use by AVM systems.

As demonstrated by the proliferation of diverse AVM technologies since the Commission's adoption of the interim AVM rules nearly twenty years ago, AVM technologies have evolved, the industry has matured and the myriad applications for AVM technologies have exceeded the imagination and expectations of that time. Indeed, the AVM-based modulated backscatter technology[9/] used in MFS/TI's ETTM system is a prime example of applications and benefits that can be made available to the public in a technically unfettered environment. As detailed in MFS/TI's Joint Comments in this proceeding, the California Department of Transportation has already contracted for the deployment of the MFS/TI ETTM system on State Route 91, a major state highway. The California Department of Transportation also recently awarded a $30 million contract to MFS to install the MFS/TI ETTM toll collection system on nine California bridges and implement an electronic toll management system.

[8/] *See, e.g.* Comments of CALTRANS; Comments of Hughes Aircraft Company; Comments of Association of American Railroads.

[9/] Modulated backscatter technology describes an AVM identification system in which low power radio frequency signals are emitted from a reader to the tag and reflected back to the reader.

MFS/TI concur with the Commission that the AVM market has sufficiently matured to warrant the adoption of permanent AVM rules. However, MFS/TI believe that the rules adopted should provide the most flexibility for future innovations and increased competition among AVM system operators. Consistent with this view, MFS/TI continue to urge the Commission to adopt a spectrum plan for the AVM band (902 - 928 MHz) that reasonably accommodates all existing technologies on a shared basis without limiting the development of new technologies to pre-ordained spectrum blocks. For the reasons described below, PacTel's spectrum sharing plan fails to adequately meet these objectives and should therefore be rejected unless modified.

III. THE PACTEL WIDE-AREA AVM SPECTRUM SHARING PROPOSAL DOES NOT APPROPRIATELY BALANCE THE COMPETING INTERESTS FOR USE OF THE 902-928 MHZ BAND

At first glance, PacTel's spectrum sharing proposal seems to balance the equities between the need for a large block of contiguous spectrum for shared use by nonwide-area AVM systems and PacTel's need for exclusive spectrum for wide-area AVM systems, especially since PacTel had until now steadfastly maintained that it was technically infeasible for more than one wide-area AVM system to occupy the same service area.[10/] Despite the admittedly significant improvement in this spectrum utilization proposal, a close examination of the spectrum utilization chart (*See* page 4) suggests that, contrary to the public interest, PacTel's revised spectrum plan still proposes permanent AVM rules that largely mirror its technology to the competitive disadvantage of other AVM technologies. Further, while PacTel's revised spectrum plan attempts to conserve spectrum by proposing sharing rules, it, in fact, wastes significant spectrum by unnecessarily fragmenting the band of spectrum available for use by other AVM

[10/] *See, e.g.* Petition for Rulemaking of North American Teletrac and Location Technologies (filed May 28, 1992); Comments of PacTel, PR Docket No. 93-61 (filed June 29, 1993).

systems. Like the original 2-8-6-8-2 MHz spectrum plan, PacTel's new .5-9.5-12.89-.5-2.61 MHz spectrum sharing plan unnecessarily segments the available 26 MHz in an inefficient and wasteful manner. The spectrum sharing plan essentially reserves 10 MHz of spectrum for use by wide-area AVM systems -- 9.5 MHz of contiguous spectrum between 902.5- 912 MHz and 500 KHz at 924.89-925.39. Because the spectrum sharing plan isolates nearly 3 MHz of the remaining spectrum, as a practical matter, only 12.89 MHz of contiguous spectrum would be available for all other users of the band.

Moreover, in MFS/TI's view, because few nonwide-area AVM systems could operate in a scant 2.61 MHz of spectrum, this spectrum sharing plan wastes 2.61 MHz of spectrum. Although 2.61 MHz of wasted spectrum is an improvement over the 4 MHz wasted under PacTel's previous spectrum plan, MFS/TI submit that this spectrum sharing plan is not sufficiently compelling to warrant this level of spectrum waste. PacTel provides no technical explanation for placing the forward links for the wide-area AVM systems outside of the contiguous 10 MHz exclusively designated for those systems. PacTel merely states in a conclusory manner and without any supporting data that placing the forward links outside the band will offset the service degradation resulting from sharing the 902.5 - 912 MHz band and "provide for future uses."[11/] Given the scarcity of spectrum and the compelling public interest in efficient use of the spectrum, the Commission must strive to maximize use of the radio spectrum today, not in the future, by ensuring that no useful spectrum lies fallow. Accordingly, MFS/TI urge the Commission reject PacTel's spectrum sharing plan unless it is modified to eliminate spectrum inefficiencies and waste.

11/ *See* PacTel *Ex Parte* at 2.

MFS/TI fervently believe that a single, exclusive allocation of 8 MHz is sufficient to support multiple wide-area, pulse ranging AVM systems. In MFS/TI's view, other than to state the inability of its technology to operate in 8 MHz of spectrum, PacTel simply has not submitted any credible technical evidence that 8 MHz of spectrum is technically insufficient to house wide-area AVM systems. In fact, PacTel's own spectrum utilization chart suggests that 8 MHz of spectrum is sufficient if the system does not use a wideband forward link. Of the 10 MHz requested, PacTel's spectrum utilization chart (reproduced on p. 4) specifies that 6.5 MHz (904 - 910.5 MHz) is required for the location function of the AVM system and 500 KHz (924.89 - 925.39 MHz) is required for a narrowband forward link. In a note relating to the chart, PacTel states:

> If either system does not use a wideband forward link, it has the **option** of using 8 MHz of contiguous spectrum (LOCATION segment -- 6.5 MHz -- PLUS their appropriate WBFL sub-segment). [*emphasis added*]

This statement suggests that some wide-area AVM systems can operate without a wideband forward link (1.5 MHz). In that event, PacTel proposes that the system operator would have the option of using 8 MHz of contiguous spectrum. Given the existing severe spectrum shortage, MFS/TI submit that this "option" of use should not be exclusively available to wide-area system operators. Under the circumstances, the public interest requires that the Commission err on the side of open, shared spectrum allocations. Accordingly, MFS/TI urge the Commission to adopt their alternative compromise proposal and allocate only 8 MHz of exclusive spectrum for use by wide-area AVM systems and the remaining 18 MHz of contiguous spectrum for flexible, nonwide-area AVM use (including forward links for the wide-area AVM systems) on a shared basis.

Given the relatively high standard that the Commission should impose on a proposal to dedicate spectrum for exclusive use and the numerous diverse technologies developing in this area, MFS/TI submit that their alternative allocation proposal best meets the public interest and the industry's interests at this time.

III. CONCLUSION

For the foregoing reasons, MFS/TI urge the Commission to expeditiously conclude this proceeding by adopting the spectrum plan that will reasonably accommodate all existing AVM technologies, encourage innovation and promote competition.

Respectfully submitted,

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